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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/932,791 | 08/17/2001 | Mark E. Patton | BW-DKT01010 | 5440 |

32175 7590 12/20/2004

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| EXAMINER | |
|---|---|
| PAIK, STEVE S | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2876 | |

DATE MAILED: 12/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Supplemental Notice of Allowability | Application No. 09/932,791 | Applicant(s) PATTON, MARK E. | |
|---|---|---|---|
| | Examiner Steven S. Paik | Art Unit 2876 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--*

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the Amendment filed on June 22, 2004*.

2. ☒ The allowed claim(s) is/are *3-18 and 22-37*.

3. ☒ The drawings filed on *27 August 2001* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   **Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20041206* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Steven Paik

**STEVEN S. PAIK**
**PRIMARY EXAMINER**

## SUPPLEMENTAL DETAILED ACTION

### *Response to Amendment*

1. Receipt is acknowledged of the Amendment filed June 22, 2004. The Amendment includes cancelled claims 1, 2, and 19-21 and newly added claims 36 and 37. Accordingly, claims 3-18 and 22-37 remain in the application.

## EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Frank F. Tian on August 26, 2004.

The application has been amended as follows:

**IN THE SPECIFICATION:**

On page ~~15~~ 5, line 16, add the following paragraph:

It is commonly known that scanning systems typically have different subsystems, such as the scanning engine, the optical sensors and the decoder. Some of the subsystems, such as the decoder may be incorporated into a microcontroller. The interfaces between these different subsystems must support the required processing power and allow one to improve one part of a scanning system without redesigning other systems. A bar code reader is the equivalent of a scanning engine or at least includes the scanning engine. The present invention teaches the use of just a subsystem of a scanning system, i.e. a scanning engine, for detection of missing,

misallocated or defective chain links, or other parts. Because the line images derived from the chain links or other parts do not have identical characteristics of a conventional bar code which has to meet certain industry standards, such as ISO/ANSI standards. the line images derived from the chain link or other parts is not identical as that of the bar codes. Furthermore. the interfaces between these different subsystems must support the required processing power and allow one to improve one part of a scanning system. In other words, the present invention uses merely part of a Scanning system, not for scanning a bar code, but for detection of missing, misallocated, or defective chain links or other parts.

**IN THE CLAIMS:**

1. (Previously Cancelled)

2. (Previously Cancelled)

3. (Previously amended) The method of claim 36, in which the workpiece is a plurality of parts in a container.

4. (Previously amended) The method of claim 36, in which the deriving step (c) comprises the steps of amplifying an output from the scanning engine and filtering the amplified output.

5. (Previously amended) The method of claim 36, in which the deriving step (c) further comprises the step of extracting a portion of the signal output representing a part of the line image, forming a data analysis window, and the comparison step (d) is performed only on the portion of the image in the data analysis window.

6. (Previously presented) The method of claim 5, further comprising the step of providing scannable indicia on at least one side of the workpiece, in position to be imaged by the scanning

engine along with the line image of the workpiece, and the step of extracting uses the imaged scannable indicia as a marker to determine the data analysis window.

7. (original) The method of claim 6, in which the scannable indicia are bar codes.

8. (original) The method of claim 6, in which scannable indicia are provided on each end of the workpiece, and the data analysis window is taken between the detected scannable indicia.

9. (Previously amended) The method of claim 36, in which the step of deriving a processed signal comprises producing an integral signal level representing an average level of the signal output of the scanning engine, and the step of comparing comprises comparing the integral signal level to a reference signal level.

10. (Previously amended) The method of claim 36, in which the step of deriving a processed signal comprises converting the signal output of the scanning engine into a number.

11. (original) The method of claim 10, in which the reference is a number, and the step of comparing comprises comparing the two numbers.

12. (Previously presented) The method of claim 10, in which the number is derived by counting level transitions in the output of the scanning engine across the linear image.

13. (original) The method of claim 10, in which the number is a binary number in which each bit represents a detection or non-detection of a part.

14. (Previously amended) The method of claim 36, further comprising the step, before the detecting step (b) of illuminating the workpiece.

15. (original) The method of claim 14, in which the workpiece is illuminated so that light reflects off the workpiece, and the linear image is produced from a reflected light image of the workpiece.

16. (Previously presented) The method of claim 14, in which the workpiece is illuminated from behind, such that the workpiece is between the illumination and the scanning engine, and the linear image is produced by the parts blocking light from the illumination.

17. (Previously amended) The method of claim 36, in which the workpiece is moved continuously relative to the scanning engine.

18. (Previously amended) The method of claim 36, in which the workpiece is moved in a start-stop motion relative to the reader, and the line image is detected while the workpiece is stationary.

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Previously amended) The missing part detector system of claim 37, further comprising a chain guide having vertical slots slightly wider than the chain, through which said scanning engines scan said chain links.

23. (original) The missing part detector system of claim 22, wherein an inside of chain guide is painted black to minimize background reflections.

24. (Previously amended) The missing part detector system of claim 37, wherein the workpiece is positioned within a depth-of-field for said light-sensitive array.

25. (Previously amended ) The missing part detector system of claim 37, wherein the signal processing circuit comprises a high pass filter and adjustable trigger level pre-amp.

26. (Previously amended). The missing part detector system of claim 37, wherein the signal processing circuit utilizes mathematical integration of an output signal from said light

sensitive array and calculates an area under a measured output curve, and the reference is a voltage.

27. (Previously amended) The missing part detector system of claim 37, wherein the signal processing circuit counts a number of level transitions in the signal output of the light sensitive array, and the reference is a preset value.

28. (original) The missing part detector system of claim 27, wherein the signal processing circuit includes a variable analysis window that only counts changes within said analysis window, such that signals outside the window are ignored by said analysis system.

29. (Currently amended) The missing part detector system of claim ~~claim~~ 37, in which the light source is located so that the workpiece is illuminated from a same side as the light sensitive array, such that the line image is detected by reflection of light from the workpiece.

30. (Currently amended) The missing part detector system of claim ~~claim~~ 37, in which the light source is located behind the workpiece, such that the light from the light source silhouettes the workpiece, and the line image is detected by light blocked by parts or passed where there are no parts.

31. (Previously presented) A method of detecting missing parts in a workpiece comprising a plurality of parts, comprising the steps of:

a) moving the workpiece relative to a scanning engine;

b) detecting a line image across the workpiece with scanning engine, producing a signal output representative of the line image;

c) deriving a processed signal from the signal output of the scanning engine;

d) comparing the processed signal to a reference signal representing a workpiece without missing parts; and

e) indicating if the processed signal does not match the reference;

wherein the step of deriving a processed signal comprises converting the signal output of the scanning engine into a number;

wherein the reference is a number, and the step of comparing comprises comparing the two numbers; and

wherein the number is a binary number in which each bit represents a detection or non-detection of a part.

32. (Previously presented) A method of detecting missing parts in a workpiece comprising

a plurality of parts, comprising the steps of:

a) moving the workpiece relative to a scanning engine;

b) detecting a line image across the workpiece with scanning engine, producing a signal output representative of the line image;

c) deriving a processed signal from the signal output of the scanning engine;

d) comparing the processed signal to a reference signal representing a workpiece without missing parts; and

e) indicating if the processed signal does not match the reference;

in which the workpiece is moved in a start-stop motion relative to the reader, and the line image is detected while the workpiece is stationary.

33. (Previously presented) A missing part detection system for detection of missing parts in a workpiece having a plurality of parts, comprising:

a) a light source for illuminating the workpiece;

b) a light sensitive array for detecting a line image of the workpiece, produced by said light source, having a signal output representative of the detected line image; and

c) a signal processing circuit having an input coupled to the signal output of the light sensitive array, and an output, such that the signal output of the light sensitive array is compared to a reference signal representative of a complete workpiece without missing parts, and the output of the signal processing circuit producing a signal when the comparison indicates a part is missing;

wherein signal processing circuit utilizes mathematical integration of an output signal from said light sensitive array and calculates an area under a measured output curve, and the reference is a voltage.

34. (Previously presented) A missing part detection system for detection of missing parts in a workpiece having a plurality of parts, comprising:

a) a light source for illuminating the workpiece;

b) a light sensitive array for detecting a line image of the workpiece, produced by said light source, having a signal output representative of the detected line image; and

c) a signal processing circuit having an input coupled to the signal output of the light sensitive array, and an output, such that the signal output of the light sensitive array is compared to a reference signal representative of a complete workpiece without missing parts, and the

output of the signal processing circuit producing a signal when the comparison indicates a part is missing;

wherein the signal processing circuit counts a number of level transitions in the signal output of the light sensitive array, and the reference is a preset value; and

wherein the signal processing circuit includes a variable analysis window that only counts changes within said analysis window, such that signals outside the window are ignored by said analysis system.

35. (Previously presented) A missing part detection system for detection of missing parts in a workpiece having a plurality of parts, comprising:

a) a light source for illuminating the workpiece;

b) a light sensitive array for detecting a line image of the workpiece, produced by said light source, having a signal output representative of the detected line image; and

c) a signal processing circuit having an input coupled to the signal output of the light sensitive array, and an output, such that the signal output of the light sensitive array is compared to a reference signal representative of a complete workpiece without missing parts, and the output of the signal processing circuit producing a signal when the comparison indicates a part is missing;

in which the light source is located behind the workpiece, such that the light from the light source silhouettes the workpiece, and the line image is detected by light blocked by parts or passed where there are no parts.

36. (Previously presented) A method of detecting missing parts in a workpiece comprising a plurality of parts, comprising the steps of:

a) moving the workpiece, in which the workpiece is a parallel-link chain, and the missing part is a link in the chain relative to a scanning engine;

b) detecting a line image across the workpiece with scanning engine, producing a signal output representative of the line image;

c) deriving a processed signal from the signal output of the scanning engine;

d) comparing the processed signal to a reference signal representing a workpiece without missing parts; and

e) indicating if the processed signal does not match the reference.

37. (Previously presented) A missing part detection system for detection of missing parts in a workpiece having a plurality of parts, comprising:

a) a light source for illuminating the workpiece, in which the workpiece is a parallel-link chain, the missing parts are links in the chain, and there are two scanning engines, one each to scan guide row and non-guide row links of a chain; and

b) a light sensitive array for detecting a line image of the workpiece, produced by said light source, having a signal output representative of the detected line image; and

c) a signal processing circuit having an input coupled to the signal output of the light sensitive array, and an output, such that the signal output of the light sensitive array is compared to a reference signal representative of a complete workpiece without missing parts, and the output of the signal processing circuit producing a signal when the comparison indicates a part is missing.

***Allowable Subject Matter***

3. Claims 3-18 and 22-37 are allowed.

The following is an examiner's statement of reasons for allowance: the cited prior arts of record do not disclose the claimed method and a system for detecting a missing part of a workpiece comprising, among other things, a binary number in which each bit representing a detection or non-detection part and the workpiece being moved in a start-stop motion relative to a reader and the line image is detected while the workpiece is stationary. The missing part detecting system further comprises a light source that is located behind the workpiece, such that the light from the light source silhouettes the workpiece, and the line image is detected by light blocked by parts or passed where there are not parts. Furthermore, the method includes a signal processing circuit utilizing mathematical integration of an output signal from a light sensitive array and calculating an area under a measured output curve, and the reference being a voltage.

After further search and thorough examination of the present application and in view of the Applicant's arguments and amendments, claims 3-18 and 22-37 are found to be in condition for allowance over the prior art made of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven S. Paik whose telephone number is 571-272-2404. The examiner can normally be reached on Mon - Fri (5:30am-2:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Lee can be reached on 571-272-2398. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Steven S. Paik
Primary Examiner
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ssp